AMENDMENT BEFORE FIRST EXAMINATION

Please amend the above-identified application as follows:

In the claims:

Cancel claims 15-21 without prejudice.

Amend claims 1, 22-26 to read as follows:

1. (amended) An apparatus, comprising:

a monolithic device, the monolithic device comprising;

a first CMOS imaging array; and

a dark current monitoring device integrated with the first CMOS imaging array, the dark current monitoring device monitoring the dark current during the time that the first CMOS imaging array is receiving an image; and

a recording of offset signals O_i; the ofset signals O_i recorded by exposing the first CMOS image array for a time t_s, where t_s is a short enough time that dark current and projected light produced signals are small compared to offset signals in pixels of the first CMOS array.

22. (amended) A method of recording an image of an object using light reflected or transilluminated from the object, comprising;

a)forming an image of the object on a first CMOS image array by projecting the light reflected or transilluminated from the object on to the first CMOS image array, the first CMOS image array formed on a monolithic semiconductor substrate; and

b) monitoring the dark current of the first CMOS image array with at least one dark current monitoring device integrated with the first CMOS imaging array on the monolithic semiconductor substrate, the monitoring of the dark current concurrent with the forming of the image;

c) exposing the first CMOS image array for a time t_s, where t_s is a short enough time that dark current and projected light produce signals small compared to offset signals in pixels of the first CMOS array; and then

d) recording the offset signals O_i measured as a result of exposure for time t_s; and then

e) subtracting O_i from signals produced by the first CMOS image array when exposure times are long enough that dark current signals are not small compared with O_i.

23. (amended) The method of claim 22, wherein the dark current signals of step c) are produced from an unilluminated first CMOS image array, and further comprising;

f) recording signals $S_{ij} = G_i(\ f_i(T, t))$ which result from step e).

24. (amended) The method of claim 23, further comprising;

g) projecting light from a uniformly reflecting extended object on to the first CMOS array, the light intensity high enough that dark current signals are small compared to signals produced by the light illumination; and

h) recording signals $S_i = G_i(k_i I_i R_i QE_i) + O_i$ from the first CMOS array produced by light projected from the uniformly reflecting object; then

i) subtracting O_i from the results of step f);

j) recording an effective gain coefficient $G_i^* = G_i(k_i I_i QE_i)$.

25. (amended) The method of claim 24, wherein;
the step of forming an image of the object comprises recording signals
$S_i = G_i^* R_i + O_i + G_i f_i(T, t)$ from the first CMOS array; further comprising;

k) correcting the recorded values S_d to calculate $G_i f_i(T, t)$, wherein the results of the step of monitoring the dark current are used to correct the recorded values S_d; and

l) calculating R_i from the known values of S_i, G_i^*, O_i and $G_i f_i(T, t)$.

26. (amended) A system, comprising:

a monolithic device, the monolithic device comprising;

a first CMOS imaging array; and

a dark current monitoring device integrated with the first CMOS imaging array, the dark current monitoring device monitoring dark current concurrently with the recording of an image by the first CMOS imaging array;

a recording of offset signals O_i; the ofset signals O_i recorded by exposing the first CMOS image array for a time t_s, where t_s is a short enough time that dark current and projected light produced signals are small compared to offset signals in pixels of the first

CMOS array;

an optical system for imaging light reflected or transilluminated from an object on to the first CMOS imaging array; and

circuitry for correcting the output from the first monolithic CMOS image array to account for the dark current monitored by the dark current monitoring device.

Add the following new claims

30. (New Claim) The method of claim 22, further comprising;
recording an output from the first monolithic CMOS image array; and
correcting the output from the first monolithic CMOS image array to account for the dark current monitored by the at least one dark current monitoring device.

31. (New Claim) The method of claim 30, wherein the step of correcting comprises;

recording (a) an output of the at least one dark current monitoring device and (b) the dark current output from each pixel of the unilluminated first CMOS image array in a different step than the step of forming the image;

calculating the dark current contribution at each pixel during the forming of the image on the basis of the dark current monitored concurrently with forming the image; and

subtracting the dark current contribution at each pixel from the output of the first monolithic CMOS image array.

32. (New Claim) The method of claim 30, wherein the step of correcting is performed by circuitry integrated on the monolithic semiconductor substrate.

33. (New Claim) The method of claim 22, wherein the step of monitoring the dark current comprises;

monitoring the temperature of the first monolithic CMOS imaging array with at least one temperature monitoring device integrated with the first monolithic CMOS imaging array; and

calculating the dark current from the monitored temperature.

34. (New Claim) The method of claim 33, wherein the step of monitoring temperature comprises;

monitoring the temperature at a plurality of locations on the monolithic semiconductor substrate; and

calculating the temperature variation over the first CMOS image array during the forming of the image.

35. (New Claim) The method of claim 22, wherein the step of monitoring the dark current comprises;

monitoring the dark current at a plurality of locations on the monolithic semiconductor substrate; and

calculating the variation of dark current over the first CMOS image array during the forming of an image of the object.

REMARKS

Consideration of the application in view of the above amendments and the following remarks is respectfully requested.

The amended specification, with deletions bracketed and additions underlined, is appended at the end of this response and amendment.

Claims 1-29 are pending in this application. Claims 15-21 have been canceled. Claims 1, 22-26